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EXAMINER				
LI, SHI K				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

09/990,964

Applicant(s)

CHRAPLYVY ET AL.

Examiner

Shi K. Li

Art Unit

2613

Period for Reply -- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 10-13, 15, 16 and 21-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 10-13, 15, 16 and 21-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/C)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 5/7/08, 5/23/08

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claim 1, 10-13, 15-16, 21, 24-25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atia et al. (W. Atia et al., "Demonstration of Return-to-Zero Signaling in Both OOK and DPSK Formats to Improve Receiver Sensitivity in an Optically Preamplified Receiver", IEEE Lasers and Electro-Optics Society 12th Annual Meeting, 8-11 Nov. 1999) in view of Clausen et al. (U.S. Patent 6,832,050 B1) and Fukuchi (U.S. Patent 5,745,613).

Regarding claims 1 and 16, Atia teaches in FIG. 1b an apparatus adapted for use in transmission in an optical communication system, comprising a phase modulator for modulating a sequence of return-to-zero (RZ) pulses which is generated by another M-Z modulator of fig. 1b (see 4th paragraph, second sentence: "The transmitter consists of a DFB laser externally modulated by a LiNbO₃ Mach-Zehnder that is sinusoidally driven to carve out RZ pulses"). Atia teaches to use DPSK format (see title). The differences between Atia et al. and the claimed invention are (a) Atia does not teach the duty cycle of the RZ pulses, (b) Atia et al. does not teach a wavelength division multiplexer, (c) Atia et al. does not teach a dispersion managed optical transmission medium.

However, it is common and usually necessary to manage dispersion along an optical transmission medium. Clausen et al. teaches in FIG. 4 a transmission system comprising dispersion compensating devices (a) and (b). Device (a) is at the input of the transmission fiber, i.e., pre-dispersion compensation; and device (b) is at the output of the transmission fiber, i.e.,

post-dispersion compensation. Clausen et al. teaches in col. 3, lines 60-62 that it is advantageous to use short pulses. In particular, Clausen et al. teaches in col. 6, lines 1-5 to use pulses of 2.5 ps for a 40 Gb/s signal, i.e., a duty cycle of 10 %. One of ordinary skill in the art would have been motivated to combine the teaching of Clausen et al. with the transmission system of Atia because the method of Clausen et al. reduces timing and amplitude jitter in transmission of RZ modulated pulses. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use pre- and post dispersion compensation, as taught by Clausen et al., in the transmission system of Atia because the method of Clausen et al. reduces timing and amplitude jitter in transmission of RZ modulated pulses.

The combination of Atia and Clausen et al. still fails to teach a wavelength division multiplexer to combine an output signal of the modulator with other phase modulated signals having optical carriers with different wavelengths. However this structure is well known in the art. For example, Fukuchi teaches a WDM to combine an output signal of the modulator with other modulated signals having optical carriers with different wavelengths (see fig. 1). It would have been obvious to a skilled artisan at the time of invention to multiplex several modulated signal together as indicated by Fukuchi in order to efficiently utilize the bandwidth in the transmission in the modified system of Atia et al. and Clausen et al.

Regarding claims 10-11, Atia et al. teaches on page 226, 4th paragraph LiNbO₃ Mach-Zehnder modulator.

Regarding claim 12, the combined invention of Atia and Clausen et al. teaches that the apparatus further comprises a receiver including a delay demodulator for receiving the optical phase modulated signal from the dispersion managed optical transmission medium (note receiver

of FIG. 1(b) of Atia; see also middle of 4th paragraph: "the receiver incorporates a Mach-Zehnder demodulator with a 1-bit time delay followed by a 10 GHz balanced detector").

Regarding claim 13, the combined invention of Atia and Clausen et al. teaches that the apparatus further comprises a balanced receiver for recovering said input data from the phase modulated signal (note receiver of fig. 1 b of Atia; see also middle of 4th paragraph: "the receiver incorporates a Mach-Zehnder demodulator with a 1-bit time delay followed by a 10 GHz balanced detector").

Regarding claim 15, the combined invention of Atia et al. and Clausen et al. teaches a discrete or distributed means of erbium-doped fiber amplification or Raman amplification (see EDFA of fig. 1b of Atia et al.).

Regarding claims 21 and 25, Clausen et al. teaches in FIG. 4 pre-dispersion compensation and post-dispersion compensation.

Regarding claim 24 and 28, Clausen et al. teaches in col. 3, lines 62-64 high dispersion fibers.

3. Claims 22-23 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atia et al., Clausen et al. and Fukuchi as applied to claims 1, 10-13, 15-16, 21, 24-25 and 28 above, and further in view of Doran et al. (U.S. Patent 7,352,970 B2).

Atia et al., Clausen et al. and Fukuchi have been discussed above in regard to claims 1, 10-13, 15-16, 21, 24-25 and 28. The difference between Atia et al., Clausen et al. and Fukuchi and the claimed invention is that Atia et al., Clausen et al. and Fukuchi do not teach soliton transmission. Doran et al. teaches in FIG. 5 a dispersion management system for soliton transmission. One of ordinary skill in the art would have been motivated to combine the

teaching of Doran et al. with the modified apparatus of Atia et al., Clausen et al. and Fukuchi because using soliton can transmit signal over a long distance. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use soliton for transmission, as taught by Doran et al., in the modified apparatus of Atia et al., Clausen et al. and Fukuchi because using soliton can transmit signal over a long distance.

Regarding claims 23 and 27, Doran et al. teaches in FIG. 5 concatenating fibers have alternating and opposite dispersion characteristics.

Response to Arguments

4. Applicant's arguments filed 16 October 2008 have been fully considered but they are not persuasive.

The Applicant argues that there is no predictability of success when transitioning from an optical single channel application to an optical WDM system. (Spec. p. 1-2, Background of the Invention). While Applicants agree that a wavelength division multiplexer is a common structure well known to one of ordinary skill in the art, it is not obvious to use RZ-DPSK or other RZ-phase shift keying format in a long haul or ultra long haul WDM system where there is no predictability of success. Furthermore, there is no suggestion or motivation found in the prior art (Atia, Clausen, or Fukuchi) that would suggest to one of ordinary skill to create the apparatus as embodied in claim 1. Fukuchi discloses WDM with non-return-to-zero (NRZ) phase encoding and, as explained in Applicants' specification, "the desire to have constant intensity in every WDM channel has lead to NRZ-DPSK [as in Fukuchi], rather than RZ-DPSK [this application]. It was not until recently did we realize that constant intensity is not necessary and that RZ-DPSK has significant advantages over NRZ-DPSK in LH and ULH transmission..." (Spec. p. 9, middle

par.). Thus Applicants submit that Fukuchi teaches the opposite of the invention as embodied in claim 1 and would not suggest to one of ordinary skill to combine the WDM system of Fukuchi with Atia and Clausen to arrive at Applicants' claim 1. See generally MPEP 2143 and MPEP 2143.02.

First, the Examiner recognizes that a statement or argument by the attorney is not factual evidence (MPEP 716.01). On the other hand, Fukuchi provides strong evidence that at the time of the invention, it is obvious to combine optical carriers with different wavelengths using wavelength division multiplexing technique. Since Fukuchi has demonstrated that it can be done, it is reasonable for the Examiner to expect that one of ordinary skill in the art can combine the teaching of Atia et al., Clausen et al. and Fukuchi successfully with reasonable amount of experiments.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (7:30 a.m. - 4:30 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

skl
15 December 2008

/Shi K. Li/
Primary Examiner, Art Unit 2613

Application/Control Number: 09/990,964
Art Unit: 2613

Page 8